CONTRACT DATA REQUIREMENTS LIST
(*1 Data Item*)

Form Approved
OMB No. 0704-0188

A. CONTRACT LINE ITEM NO.	B. EXH/ATCH NO.	C. CATEGORY TDP ___ TM ___ OTHER _X_

D. SYSTEM / ITEM	E. CONTRACT / PR NO.	F. CONTRACTOR
Battery Conditioner and Analyzer		

1. DATA ITEM NO.	2. TITLE OF DATA ITEM	3. SUBTITLE
A001	COMMERCIAL SUPPORT DOCUMENTATION	Operation and Maintenance

4. AUTHORITY (*Data acquisition Document No.*)	5. CONTRACT REFERENCE	6. REQUIRING OFFICE
DI-MISC-80557	IAW Contract Specification	CODE 6095

7. DD 250 REQ	9. DIST STATEMENT	10. FREQUENCY	12. DATE OF FIRST SUBMISSION	14. DISTRIBUTION
LT	SEE BLK 16	OTIME	See Blk 16	
8. APP CODE		**11. AS OF DATE**	**13. DATE OF SUBSEQUENT SUBMISSION**	
A				

16. REMARKS

BLOCK 7 - SUBMIT ONE INFO COPY ONLY OF LT VIA EMAIL TO Martin_j@crane.navy.mil.

BLOCK 8 - NSWC CRANE CODE 6095 WILL REVIEW THE DRAFT FOR CONTENT AND TECHNICAL ACCURACY IN REQUIREMENTS OF THE SPECIFICATION. WRITTEN COMMENTS TO BE INCORPORATED INTO THE FINAL WILL BE PROVIDED WITHIN 30 DAYS AFTER RECEIPT OF THE DRAFT.

BLOCK 9 - DISTRIBUTION STATEMENT C: " Distribution authorized to : U.S. Government agencies and their contractors.
Other requests for this document shall be referred to COMMANDER, NAVSURFWARCENDIV, CODE 6095 B-2949 300 HIGHWAY 361, CRANE IN 47522-5001.

BLOCKS 10 AND 12. SUBMIT THE DRAFT WITHIN 30 DAYS AFTER AWARD OF CONTRACT. SUBMIT THE FINAL WITHIN 15 DAYS AFTER RECEIPT OF GOVERNMENT COMMENTS.

BLOCK 14 - ADDRESSEE LIST - AL-01
COMMANDER
CODE 6095 BLDG 2949 ATT T MERRIWEATHER
NAVAL SURFACE WARFARE CENTER
300 HIGHWAY 361
CRANE IN 47522-5001
OR electronically via email to:merriweather_t@crane.navy.mil
The electronic format shall VIRUS SCANNTED in MS Office (word/excel/acess/powerpoint) version as mutually agreed upon at award.
Adobe .PDF is also acceptable

A. Addressee	b. COPIES DRAFT	FINAL	
SEE BLK 16	1	0	1
15. TOTAL	0	5	0

17. PRICE GROUP	18. ESTIMATED TOTAL PRICE

G. PREPARED BY	H. DATE	I. APPROVED BY	J. DATE
		THERESA ANDIS, CRANE DATA MANAGER	

CONTRACT DATA REQUIREMENTS LIST
(1 Data Item)

Form Approved
OMB No. 0704-0188

A. CONTRACT LINE ITEM NO.	B. EXH/ATCH NO.	C. CATEGORY TDP _____ TM _____ OTHER _X_____

D. SYSTEM / ITEM	E. CONTRACT / PR NO.	F. CONTRACTOR
BATTERY CONDITIONER/ANALYZER		

1. DATA ITEM NO.	2. TITLE OF DATA ITEM	3. SUBTITLE
A002	Commercial Off-the-Shelf Manual (COTS) and Associated Supplemental Data	

5. AUTHORITY (Data acquisition Document No.)	5. CONTRACT REFERENCE	6. REQUIRING OFFICE
DI-TMSS-80527A	Contract Specification	CODE 6095

7. DD 250 REQ	9. DIST STATEMENT REQUIRED	10. FREQUENCY	12. DATE OF FIRST SUBMISSION	14. DISTRIBUTION
LT	SEE BLK 16	OTIME	45 DAC	
8. APP CODE		11. AS OF DATE	13. DATE OF SUBSEQUENT SUBMISSION	

16. REMARKS

BLOCK 7 – Submit one Info copy only of LT to: COMMANDER, CODE 1164 BLG 64 ATT J D MARTIN NAVSURFWARCENDIV, 300 HIGHWAY 361, CRANE IN 47522-5001 OR EMAIL AS ON A001

BLOCK 9 - DISTRIBUTION STATEMENT C: "Distribution authorized to U.S. Government agencies and their contractors. Other requests for this document shall be referred to COMMANDER, NAVSURFWARCENDIV, CODE 6093, B3235, 300 HIGHWAY 361, CRANE IN 47522-5001.

Block 14 - Submit 1 paper copy and one electronic copy of the manual. Format will be in Microsoft Office formats or other software formats as Mututally agreed upon at time of award.

ADDRESSEE LIST (AL) –
Commander
CODE 6095 ATT T MERRIWEATHER
NSWC CRANE
300 HIGHWAY 361
CRANE IN 47522-5001
OR EMAIL TO: merriweather_t@crane.navy.mil

a. ADDRESSEE	b. COPIES DRAFT	FINAL REG	FINAL REPO
SEE BLK 16	0	1	1
15. TOTAL	0	5	0

17. PRICE GROUP	18. ESTIMATED TOTAL PRICE

G. PREPARED BY	H. DATE	I. APPROVED BY	J. DATE
		THERESA ANDIS, CRANE DATA MGR	

CONTRACT DATA REQUIREMENTS LIST
(1 Data Item)

Form Approved
OMB No. 0704-0188

A. CONTRACT LINE ITEM NO.	B. EXH/ATCH NO.	C. CATEGORY
0001		TDP _____ TM _____ OTHER __X_____

D. SYSTEM / ITEM	E. CONTRACT / PR NO.	F. CONTRACTOR

1. DATA ITEM NO.	2. TITLE OF DATA ITEM	3. SUBTITLE
A003	INSPECTION/TEST REPORT	

6. AUTHORITY (Data acquisition Document No.)	5. CONTRACT REFERENCE	16. REQUIRING OFFICE
DI-NDTI-80809A	CONTRACT SPECIFICATION	CODE 6095

7. DD 250 REQ	9. DIST STATEMENT REQUIRED	10. FREQUENCY	12. DATE OF FIRST SUBMISSION	14. DISTRIBUTION
LT	SEE BLK 16	ASREQ	See Blk 16	
8. APP CODE		**11. AS OF DATE**	**13. DATE OF SUBSEQUENT SUBMISSION**	
		See Blk 16	See Blk 16	

16. REMARKS

BLOCK 7 – Submit one Info copy only of LT to: COMMANDER, CODE 1164 BLG 64 ATT D MCDANIEL, NAVSURFWARCENDIV, 300 HIGHWAY 361, CRANE IN 47522-5001

BLOCK 9 - DISTRIBUTION STATEMENT C: "Distribution authorized to U.S. Government agencies and their contractors. Other requests for this document shall be referred to COMMANDER, NAVSURFWARCENDIV, CODE 6095 B2930, 300 HIGHWAY 361, CRANE IN 47522-5001.

BLOCKS 10/12/13 - Submit the report within 5 days after completion of tests.

BLOCK 14 - The report may be submitted either by electronic mail or as agreed upon prior to submission of the report(s)

ADDRESSEE LIST (AL) – Same as A001 and A002

a. ADDRESSEE	b. COPIES DRAFT	FINAL REG	FINAL REPO
SEE BLK 16	0		1
15. TOTAL	0	1	1

17. PRICE GROUP	18. ESTIMATED TOTAL PRICE

G. PREPARED BY	H. DATE	I. APPROVED BY	J. DATE

Specification For
Battery Conditioner/Analyzer

1.0 SCOPE

1.1 This specification establishes the minimum performance for the battery conditioner/analyzer (charger) part number 4-056-08 when upgraded/modified from part number 4-056-05. The upgrade/modification will be achieved by exchanging circuit cards part numbers 4-056212-01 and 4-056214-01 installed in conditioner/analyzer part number 4-056-05 with new circuit cards, part number 4-056512-01 and 4-056414-01.

1.2 This specification also establish the minimum requirements for battery conditioner/analyzer, part number 4-056-08, for fully charging a 5.5 ampere-hour Ultra Low Maintenance (ULM) nickel cadmium battery and protecting the battery from excessive overcharging, excessive discharge for retention of APU start capability and overtemperature or cell unbalance fault conditions.

2.0 APPLICABLE DOCUMENTS

Specifications

MIL-PRF-81757/14(AS)	Battery, Storage, Aircraft, Nickel-Cadmium, 24-Volt. 5.5-Ampere-Hour, Low-Maintenance, Vented
MIL-PRF-81757D	General Specification for Batteries and Cells, Storage, Aircraft, Nickel-Cadmium.
MIL-STD-810	Environmental Test Methods and Engineering Guidelines
MIL-E-5400	General Specification for Electronic Equipment, Airborne
MIL-STD-889	Dissimilar Metals
MIL-STD-461	Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment

3.0 REQUIREMENTS

3.1 Item description. The battery conditioner/analyzer, charger, shall incorporate circuitry for fully charging a 5.5 ampere-hour ULM nickel cadmium battery. Material, parts, electrical and mechanical assemblies

and workmanship shall be in accordance with the highest commercial and engineering standards of the industry.

3.2 Materials, processes, and parts. Materials, processes, and parts shall be selected in accordance with MIL-E-5400 except as otherwise specified herein. Exposed parts shall be inherently corrosion resistant or protected against corrosion.

3.3 Metals. Metals shall be of a corrosion resistant or suitably processed to resist corrosion. The use of dissimilar metals in contact with each other shall be avoided. Where contact between dissimilar metals is unavoidable, they shall be suitably protected against electrolytic corrosion. Dissimilar metals are defined in MIL-STD-889.

3.4 Insulating materials. Electrical insulating materials shall be in accordance with MIL-STD-5400.

3.5 Charger modification. Circuit cards part numbers 4-056212-01 and 4-056214-01 installed in charger part number 4-056-05 shall be removed and circuit cards part numbers 4-056512-01 and 4-056414-01 shall be installed.

3.6 Part or identification number. The part or identifying number of the charger shall be 4-056-08

3.7 Dimensions and weight. The dimensions and the configuration of the charger shall be as shown on figure 1. The weight of the charger shall be not greater than 5.0 pounds.

3.8 Connector. The charger shall utilize an MS3470W16-26P connector.

Pin allocations

A – Battery temperature sense in
B – Battery temperature sense in
C – Battery discharge monitor and pressure sense in
D – Negative remote sense in
E – Battery overtemp in
F – Battery overtemp in
G – Positive remote sense in
H – 115 VAC in
J – 28 VDC in
K – Battery low charge warning out
L – Battery fault warning out
M – 28 VDC in
N – 28 VDC no. 2 DC esntl bus sply out
P – Ground
R – 28 VDC in
S – Positive charge out
V – Battery center cell sense in

W – Warning temp compensation in
X – Battery low charge

3.9 Operating position. The charger shall be capable of operating in all charge modes while in any position.

3.10 Operating temperature. The charger shall be capable of operating in all charge modes in the temperature range of 150°F to -50°F.

3.11 Insulation resistance. The insulation resistance between any current carrying part and the charger container shall be above one megohm when tested for one minute in accordance with paragraph 4.3.

3.12 Electrical performance. The charger shall operate on 115 VAC, 400 Hz single phase, and 28 VDC power source. The normal output charge current shall be 0 to 7.5 amperes.

3.13 Low charge. The charger shall be capable of recharging a fully discharged battery. The charger shall operate at a constant current rate of 1.0 amperes until the battery voltage reaches 22 ± 0.5 volts. When the battery voltage reaches 22 ± 0.5 volts the low charge rate shall switch to the base charge rate.

3.14 Base charge. At ambient temperature the charger shall operate at a constant current rate of 7.5 ± 0.5 amperes until the battery reaches the voltage inflection point, 30.0 ± 0.5 volts, as illustrated in figure 2. For other temperatures the charger shall charge the battery in accordance with figure 2.

3.15 Overcharge. At ambient temperature the charger shall overcharge the battery at the inflection voltage of the base charge for the amount of time equal to the time required to reach the inflection voltage of the base charge or a maximum of 4.0 minutes. For other temperatures the charger shall charge the battery in accordance with figure 2.

3.16 Sustaining charge. Once the overcharge is completed, the charger shall provide a constant potential sustaining charge of 2.0 volts less than the inflection voltage of the overcharge voltage as illustrated in figure 2.

3.17 Environmental requirements. The charger shall show no:

a. Dimensional distortion beyond the specified limits or cracking of the case.
b. Radical current or voltage fluctuations during any test.
c. Mechanical or electrical failure of any part
d. Breakdown of insulation, stripping of metal plating from any component part, corrosion of metal parts.
e. Deterioration of any identification markings.

3.18 High temperature charging. The charger shall not exhibit any environmental defects and operate in all modes when tested in accordance with paragraph 4.5. Furthermore, the charger shall meet the requirements of figure 2 and paragraph 3.17

3.19 Low temperature charging. The charger shall not exhibit any environmental defects and operate in all modes when tested in accordance with paragraph 4.6. Furthermore, the charger shall meet the requirements of figure 2 and paragraph 3.17

3.20 Workmanship. The charger shall be processed in such a manner as to be uniform in quality and shall be free from defects that will affect life, functioning and appearance. There shall be no evidence of loose contacts, poor or improper molding or fabrication, damaged or improperly assembled contacts, peeling, flaking or chipping of plating or paint.

4 QUALITY ASSURANCE PROVISIONS

4.1 Visual examination. The charger shall be examined for any defects in accordance with paragraph 3.17.

4.2 Dimensions and weight. The dimensions and the weight of the charger shall be measured and recorded. The charger shall meet the requirements of figure 1 and paragraph 3.7.

4.3 Insulation resistance. A potential of 500 ± 10 volts shall be applied between any of the charger receptacle pins and the exposed metal of the case, and between sensor receptacle contact pins E or F and the exposed metal of the case. Each measurement shall last 20 seconds and shall be above one megohm.

4.4 Charging. Starting with a fully discharged battery (open circuit voltage of less than 21.5 volts) at ambient temperature, the charger shall charge the battery at 1.0 ± 0.20 amperes until the battery voltage is reaches 22 ± 0.5 volts. When the battery voltage reaches 22 ± 0.5 volts the charge current shall switch to the base charge current of 7.5 ± 0.5 amperes until the battery voltage reaches 30.0 ± 0.5 volts. When the battery voltage reaches 30.0 ± 0.5 volts the charger shall switch to overcharge mode and charge the battery at 30.0 ± 0.5 volts for a maximum time of 4 minutes. When the overcharge mode is complete, the charger shall then switch to a sustaining voltage of 28.5 ± 0.5 volts. Charge the battery for 10 ± 1.0 minutes at the sustaining voltage, then terminate charge.

4.5 High temperature charging. The charger and battery shall be placed in a temperature chamber and stored at 120 ± 2 °F for 16 hours. The charger shall then be energize in all modes of operation. The voltage and current shall be recorded to verify that the inflection voltage is in accordance with

figure 2. The charger shall meet the requirement of paragraph 3.17 and 3.18.

4.6 Low temperature charging. The charger and battery shall be placed in a temperature chamber and stored at –50 ± 2 °F for 16 hours. The charger shall then be energize in all modes of operation. The voltage and current shall be recorded to verify that the inflection voltage is in accordance with figure 2. The charger shall meet the requirement of paragraph 3.17 and 3.19.

4.7 Altitude. The charger shall be evaluated at altitude and shall be tested as follows:

a. Place the charger into an environmental chamber and within 15 minutes lower the chamber pressure to simulate an altitude of 20000 feet and lower the temperature to -50 ± 2 °F.

b. The charger shall remain at this condition for 4 hours. After the 4-hour stand, return the chamber to ambient laboratory air pressure.

c. Remove the charger from the chamber and energize the charger in all modes until the charger reaches the sustaining voltage mode

4.8 Vibration. The charger shall be subjected to the Vibration Test of MIL-STD-810, Method 514.4, Procedure I and Condition I-3.4.3. Use the test time schedule and curve for equipment mounting configuration "without vibration isolators". The charger shall be energized during the vibration test and the charger output waveform shall be free of abnormal interruptions and transient.

4.9 Electromagnetic interference testing. Electromagnetic interference shall be measured in accordance with the requirement RE102 and RS103 of MIL-STD-461. The charger shall be tested during all modes of operation.

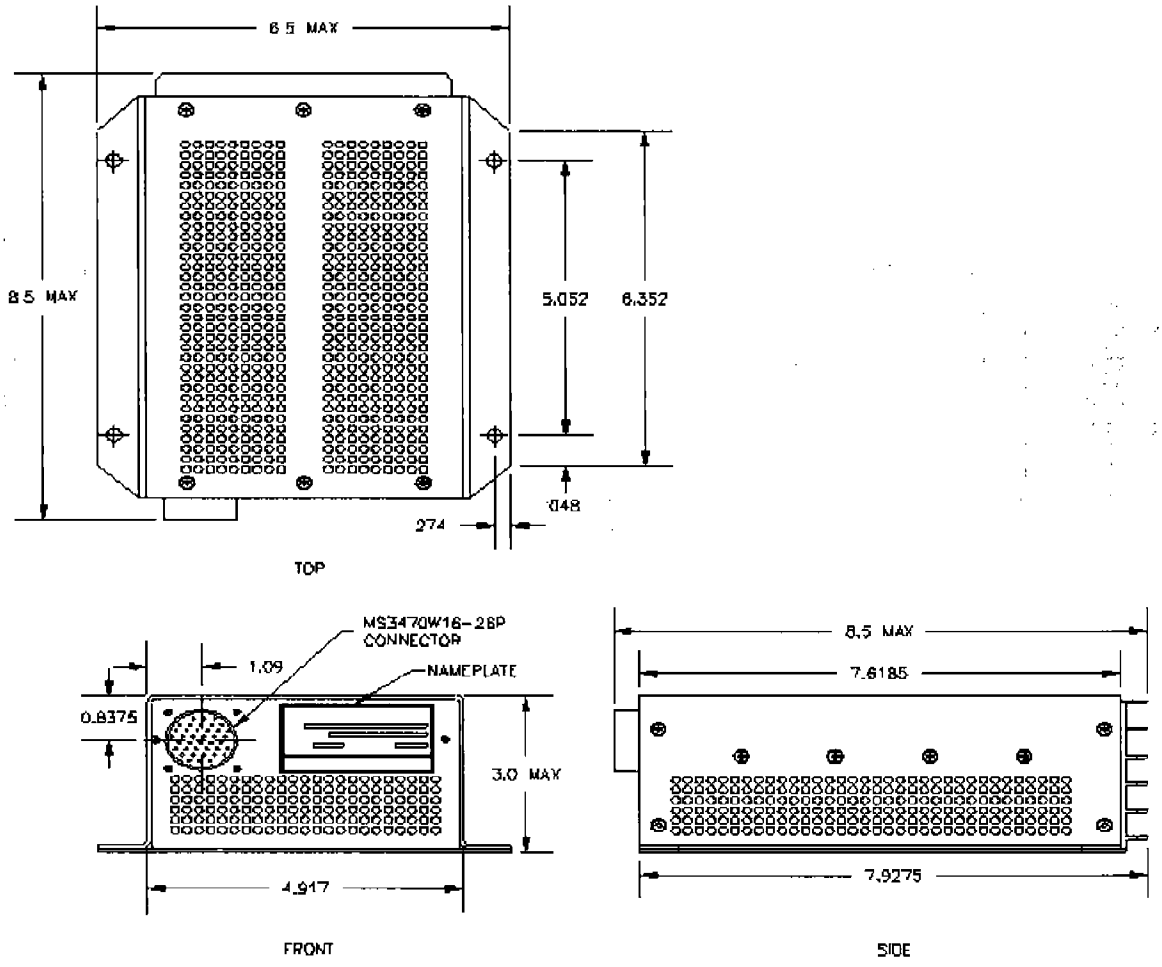

Figure 1. PIN 0-056-08 dimensions.

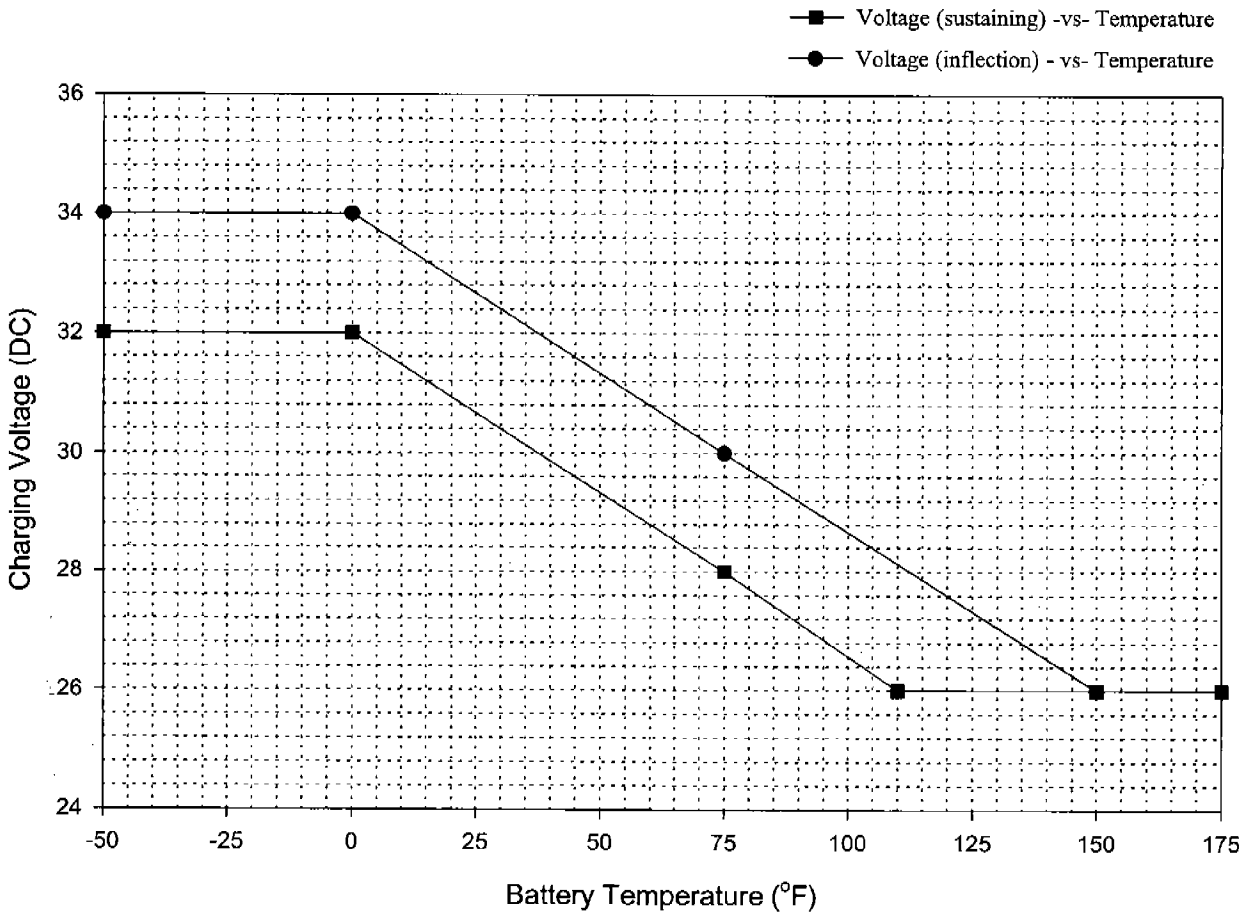

Figure 2. Charge voltage vs temperature.